論 文 内 容 要 旨

Can the Amount of Interventions during the Convalescent Phase
Predict the Achievement of Independence in Activities of Daily
Living in Patients with Stroke? A Retrospective Cohort Study

（回復期での介入量は脳卒中患者の ADL 自立を予測できるか？

–後ろ向きコホート研究–）

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Background: Patients with stroke without independence in their activities of daily living (ADL) suffer from a decline in the quality of life, and their expenditure may increase due to subsequent medical treatments. Therefore, healthcare providers are required to promptly recover the ADL of patients with stroke. Previous studies suggest that the amount and frequency of interventions are related to ADL improvement in patients with stroke. However, the diagnostic performance of factors influencing ADL independence at discharge from the convalescent rehabilitation ward has not been clarified. Therefore, the purpose of this study was to evaluate the diagnostic performance of the amount of physical, occupational, and speech therapy intervention and optimal timing necessary for the recovery of ADL in patients with stroke.

Method: This was a retrospective cohort study. Medical records of hospitalized patients between April 2013 and March 2016 were collected. The included studies involved 441 patients with stroke. Subjects admitted to the convalescent rehabilitation ward were classified into an early intervention or a non-early intervention group on the basis of the duration from the date of onset to date of hospital admission. The mRS defines 6 levels of disability with the score of 6 for death: 0 = no symptom at all; 1 = no significant disability despite symptoms, able to carry out all usual duties and activities; 2 = slight disability, unable to carry out all previous activities but able to look after own affairs without assistance; 3 = moderate disability, requires some help but able to walk without assistance; 4 = moderately severe disability, unable to walk without assistance and unable to attend to own bodily needs without assistance; 5 = severe disability, bedridden, incontinent, and requiring constant nursing care and attention; and 6 = dead. Logistic regression analysis was performed to explore the predictors of ADL independence. In this study, patients with an mRS 2 or lower were considered ADL independent, whereas those with mRS 3 or higher were considered ADL dependent. Independent variables were basic medical information, intervention amount and Functional Independent Measure (FIM) (motor and cognitive function). To comprehensively examine the extracted variables, the logit transformed value of the probability obtained from the regression analysis was defined as the score. After logistic regression analysis, the receiver operating characteristic (ROC) curve was calculated for the significant predictors to assess the cutoff point for ADL independence. A cutoff value that maximizes the likelihood ratio was specified, and sensitivity, specificity, predictive value, likelihood ratio, and area under the curve (AUC) were calculated. The AUC could distinguish between nonpredictive (AUC<0.5), less predictive (0.5<AUC<0.7), moderately predictive (0.7<AUC<0.9), highly predictive (0.9<AUC<1), and perfect prediction (AUC=1) . The significance level was set at P < 0.05.

Results: Logistic regression analysis revealed that age and physical and occupational

therapy intervention amount provided during convalescent phase and FIM motor score at admission significantly influenced independence in ADL at discharge from the hospital in the early intervention group (hospitalization date was 30 days or less). The results of ROC analysis revealed that the cutoff value of the amount of physical and occupational therapy intervention was 168 points, and the sensitivity, specificity, and likelihood ratios were 0.40, 0.77, and 1.74, respectively. The prior probability of ADL independence was 71.0%, and the posterior probability was 81.0%. The results of ROC analysis revealed that the cutoff value of score was 0.75 points, and the sensitivity, specificity, and likelihood ratios were 0.80, 0.80, and 3.92, respectively. The posterior probability was 91.0%. FIM motor score at admission was the only factor extracted for the non-early intervention group.

Discussion : Factor affecting ADL independence in the early intervention group included the amount of physical and occupational therapy intervention. The cutoff value was calculated and diagnostic performance was evaluated in this study, which revealed that the amount of physical and occupational therapy intervention sessions required to achieve ADL independence of ADL >168 h. However, the positive and negative likelihood ratios were 1.74 and 0.78, respectively. Generally, the criterion value recognized as excellent diagnostic performance is 5 or more in the positive likelihood ratio and is 0.2 or less in the negative likelihood ratio, and the amount of physical and occupational therapy interventions in this study does not meet this criterion. Therapists cannot predict the possibility of the achievement of ADL independence even if they increase the amount of physical and occupational therapy intervention. The diagnostic performance and clinical usefulness suggested from this study are as follows. This study evaluated the diagnostic performance of the scores including the age, amount of physical and occupational therapy interventions, and FIM motor score at admission to predict the ADL independence. The AUC of the scores was less than the optimum value (<0.9), but showed moderate accuracy (>0.7). Additionally, the negative predictive value was higher than positive predictive value. Therefore, the information of the age, amount of physical and occupational therapy interventions, and FIM motor score at admission of this study is clinically useful as an index to predict the possibility of ADL non-independence rather than of ADL independence.

Conclusion: The ADL independence in patients with stroke admitted to a rehabilitation ward during their convalescent phase cannot be determined simply on the basis of the amount of physical and occupational therapy they receive. Nonetheless, with the amount of interventions, ADL independence may be achieved only in younger (age < 75) patients with stroke with high motor function who could start intervention at an early stage in the convalescent rehabilitation ward.